Research on the possibility of improving energy efficiency in the hospitality industry

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Abstract. In the structure of commercial real estate, hotel infrastructure facilities occupy a special position due to their dependence on related industries: tourism, both international and domestic, entertainment industry, event organization, business environment development, etc. Also, this industry is most affected by external factors: legal, political, economic, infrastructural, communication, cultural. Trends in the introduction of energy-efficient technologies in the processes of operation and maintenance of real estate objects of the hospitality industry allow to increase their competitiveness and increase the number of transactions. The leaders in the number of investment transactions in the hotel real estate segment for 2022 are traditionally Moscow and St. Petersburg, but the development of domestic tourism gives impetus to increased investment activity in other regions of the Russian Federation. The purpose of the study is to identify the impact of the energy efficiency level on the competitiveness of hotel real estate. Research objectives: analysis of trends in the hotel real estate market, determination of indicators of competitiveness of hotel facilities depending on the type of accommodation, consumer requests and the level of energy efficiency, calculation of the integral indicator of competitiveness of hotel real estate. Research methods: comparison, analysis and synthesis, generalization, expert evaluation method. As a result of the study, the key factors of the competitiveness of hotel facilities are identified and the methodology for calculating the integral indicator of competitiveness is given. **Keywords:** classification of hotel real estate, energy efficiency, competitiveness factors, tourist flow, consumer demand, integral evaluation indicator

1 Introduction

The hotel business is an industry that is closely related to the professional provision of services for the location and service of guests in hotels. The objects of the hotel business are accommodation facilities that provide customers with occasional or permanent services for accommodation and temporary accommodation on a paid basis.

The exit of foreign brands, combined with the growth of domestic demand, is a strategic opportunity for Russian hotel chains. In 2022, the Russian hotel market grew by 5.7% compared to 2021 [1].

The number of hotels and other accommodation facilities has exceeded 30 thousand (Figure 1).

Fig. 1. Number of collective accommodation facilities in Russia [2]

The number of hotel rooms also showed an increase of 4% compared to the previous year and reached the figure of 1.08 million rooms (Figure 2).

Fig. 2. Number of rooms in hotels and other accommodation facilities in Russia [3]

The income of collective accommodation facilities in 2022 approached 0.7 trillion rubles. The average annual revenue growth of Russian CSRs over the past six years (CAGR 2017-2022) was +7.1%. In total, over the period of observation, the growth in the industry's turnover amounted to 41%.

The dynamics of the industry were positively affected by the growing demand for domestic tourism and government initiatives to support the hotel business: in July 2022, a zero VAT rate was introduced for hotel services for a period of five years. Considering that in the hotel business the main expenses are staff salaries, and the counter VAT is very small, this has become a serious growth factor.

With a fairly wide variety of accommodation options, the most popular in 2022 was an unstarred city hotel with an average of 35 rooms and a capacity of 88 beds. At the same time, the average visitor to the hotel left a little more than 2.2 thousand rubles a day [4] (Figure 3,4).

Fig. 3. Income of hotels and other accommodation facilities in Russia, billion rubles [5]
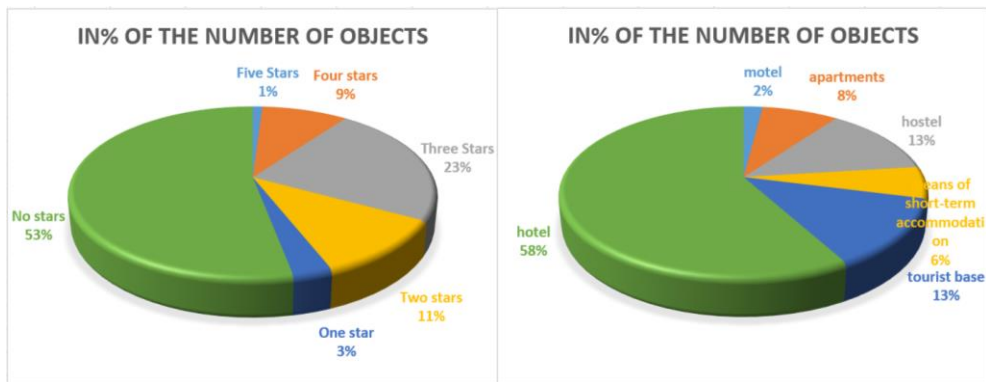

Fig. 4. The structure of collective accommodation facilities in Russia in 2022 by category, in% of the number of objects

Despite the growth rates of the industry as a whole, the average annual occupancy of collective accommodation facilities is practically not growing in hotels and other accommodation facilities: in 2022 this figure was 31%, while in 2017 it was 32%. A significant drop in the occupancy of beds in Russian collective accommodation facilities was observed only during the COVID-19 pandemic [6] (Figure 5).
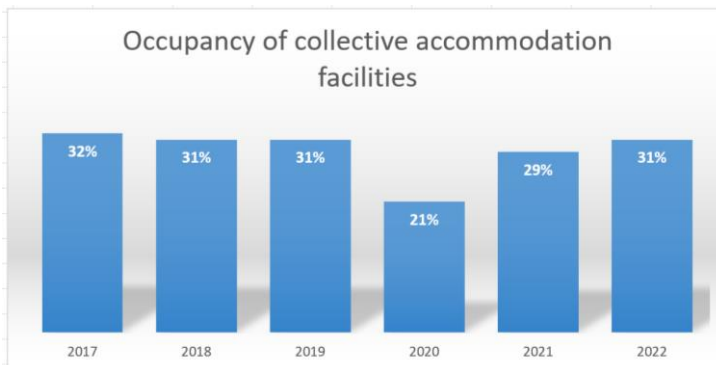

Fig. 5. Occupancy of collective accommodation facilities, in % of the number of free beds per year

The hospitality industry is the unity of all cooperating organizations, each of which performs certain functions aimed at meeting specific consumer needs. Against the backdrop of a rather large number of hotels and other accommodation facilities, the question of building a system for assessing the competitiveness of such facilities becomes relevant. The existing rating and star rating systems for hotels and hotels make it possible to evaluate mainly the largest and most famous objects according to given general characteristics. The proposed system for evaluating competitiveness makes it possible to evaluate hotel facilities primarily from the point of view of the client, to what extent the range of services offered meets their requirements in terms of quality, price and other characteristics.

2 Materials and Methods

The competitiveness of a hotel service is the ability to effectively and efficiently satisfy the needs of customers, surpassing competitors in the hotel services market in terms of consumer characteristics of the service at minimal cost to satisfy them, while ensuring the commercial success of hospitality industry organizations [7]. Competitiveness indicators are a set of criteria for quantifying the level of real estate competitiveness. To assess competitiveness, a system of indicators is used: single, group and integral [8].

A single indicator is the percentage of the values of any technical or economic parameters at which the element of need is theoretically completely satisfied (for example, the ratio of the total to the living area of an apartment) [9].

The group indicator combines individual indicators (for example, in addition to the size of the apartment and the number of rooms, the level of finishing, the location of the house, environmental criteria, the presence of an underground garage, etc. are taken into account) and characterizes the degree of satisfaction of the need as a whole.

The integral indicator - a numerical characteristic of the competitiveness of a real estate object - is expressed by the ratio of the obtained group indicator for given characteristics to the maximum possible [10].

To assess the level of competitiveness of various objects and choose the best of them, we calculate an integral indicator - the coefficient of competitiveness of a real estate object.

The calculation of the competitiveness coefficient consists of several stages, the calculation algorithm is presented below [11].

1. To form a set of characteristics of a real estate object, according to which different objects will be compared with each other. For each client, the set of characteristics will be individual, depending on the preferences and requirements for the property.

2. Fill in the "Client Request" column based on the client's requirements for the property.

3. Select several real estate objects that are most suitable for the client's request and fill in the columns "Characteristics of selected real estate objects" for each of the objects in the table "Characteristics of the competitiveness of real estate".

4. For each characteristic involved in the analysis, put down in the Table "Assessment of the degree of importance and embodiment of the object characteristics " the level of importance for the client in points in the column "Assessment of the degree of importance (I)" using the rating scale from Table 1.

5. For each of the selected objects, assess how each characteristic of the object corresponds to the client's request on a 5-point scale and fill in the columns in the Table "Implementation of the given characteristics (Imp)"

Table 1. Scale for assessing the degree of importance of the object characteristics

Object characteristics importance	Importance rating, score
Characteristic of the object to a high degree	5
Characteristic is important	4
The characteristic is important, but not too much	3
Unimportant characteristic	2
Not an important characteristic	1
I find it difficult to answer and evaluate	0

6. The final level of competitiveness (K) for each of the four properties will be calculated based on the data collected in the previous tables using the formula [12]

$$C = \frac{\sum_{i=1}^{M}\left(I_i \cdot E_i\right)}{\sum_{i=1}^{M}\left(I_{mpi} \cdot \max E\right)} \times 100\% \tag{1}$$

where C – level of product competitiveness, %;

I_i – assessment of the importance of the i-th characteristic of the product, score;

I_{mpi} – assessment of the implementation of the i-th characteristic of the product, score;

$\max E$ – maximum evaluation of the implementation, score;

M – number of product characteristics.

The most competitive will be the property with the highest value of K, the greater the value of the obtained coefficient K to 100%, the more fully this object satisfies the specified client requests.

3 Results and Discussion

The competitive advantage of one hotel over another can be assessed when both hotels meet identical guest needs related to related market segments [13-15]. The needs of a client looking for accommodation to attend business events will differ from those of a client planning to visit city attractions or concerts [16]. In this regard, the selection of real estate options and the calculation of their competitiveness should be carried out within the framework of each individual request [17]. Examples of requests are presented in Table 2.

Table 2. - Options for customer requests*

Request	Preferential accommodation	Target audience	Trip purpose	Hobbies	Price per night
1	Hostel	M, 20 y.o.	Tourism	Communication, rock music, architecture	1 500 – 2 000
2	Apartments	F, 26 y.o.	Business trip	Sports, personal care, unusual food	4 000 – 5 000
3	Hotel	M 30 y.o., F 30 y.o., child 7 y.o.	Have a fun vacation, don't cook	Physical activity, cinema, entertainment parks	5 000 – 7 000
4	Country hotel	F 25, F 28 y.o.	Rest	Yoga, nature, sports, eco-food	7 000 –10 000

* Table 2 can be supplemented with more options or conditions for the target audience.

We will select suitable real estate objects (fig.6-8) in St. Petersburg upon request 3 and calculate their competitiveness [18]:

Fig. 6 Object № 1 – hotel "Vvedensky" ****, St. Petersburg, Bolshoy prospekt. Petrograd side, 37.

Fig. 7. Object № 2 - Palace Bridge Hotel *****, St. Petersburg, Birzhevoy l., 4

Fig. 8. Object № 3 - River Palace Hotel ****, St. Petersburg, Maly avenue Vasilyevsky Island, 1.

Characteristics of the selected hotel real estate objects are presented in table 3 in columns 4, 5, 6.

Table 3. Characteristics of the hotel real estate competitiveness

N	Characteristics	Customer request	Significance assessment
1	**Room**		
1,1	Number of beds	3	5
1,2	Area	from 35 sq.m.	5
1,3	The presence of a bath	yes	5
1,4	Ventilation	fancoil	5
1,5	Wi-Fi	available	5
2	**Services**		
2,1	Restaurant	available	5
2,2	Children's menu	yes	3
2,3	Excursions	active rest is important	5
2,4	Entertainment	with children's activities	3
2,5	Room service	around the clock	3
2,6	A fitness center	desirable	3
2,7	Breakfast included in the price	yes	5
2,8	SPA	yes	3
3	**Infrastructure**		
3,1	Transport accessibility	10 min to metro	5
3,2	Location	city center	4
3,3	Green Zone	near the park	4
3,4	Nearby	food outlets, shopping centers, entertainment places (cinemas, theaters...)	5
4	**Hotel**		
4,1	Rooms	~200 rooms	3
4,2	Rating	4 – 5*	5
4,3	Stardom	4 – 5*	5
5	**Price**		
5,1	Room rate per night	5000 – 7000 rub	4
5,2	Booking with payment on the spot	yes	5
5,3	Free cancellation option	yes	5
5,4	Availability of a loyalty program	yes	3

For each of the three selected objects, the level of implementation of the specified characteristics was assessed on a 5-point scale and columns 3, 4, 5 were filled in Table 4.

The calculation of the final level of competitiveness (C) for each of the three real estate objects was carried out according to formula 1. According to the results of the calculations, the River Palace object turned out to be the most competitive. A suitable area, the presence of a fitness center, an affordable price for accommodation with breakfast included, a high rating on review sites and the presence of its own loyalty program in total make River Palace the best among the compared hotels.

The undoubted advantages of the approach under consideration include the fact that it allows you to take into account the maximum number of characteristics and choose from a variety of options the most suitable in terms of price and quality for the needs of the client.

Table 4. Assessment of the degree of importance and implementation of the object characteristics

N	Characteristics	Implementation evaluation		
		Vvedensky	Palace Bridge	River Palace
1	**Room**			
1,1	Number of beds	5	5	5
1,2	Area	1	2	3
1,3	The presence of a bath	5	0	5
1,4	Ventilation	5	5	5
1,5	Wi-Fi	5	5	5
2	**Services**			
2,1	Restaurant	5	5	5
2,2	Children's menu	5	0	5
2,3	Excursions	5	5	5
2,4	Entertainment	0	0	0
2,5	Room service	3	3	3
2,6	A fitness center	0	5	5
2,7	Breakfast included in the price	5	0	5
2,8	SPA	5	5	0
3	**Infrastructure**			
3,1	Transport accessibility	5	5	5
3,2	Location	3	5	5
3,3	Green Zone	0	0	0
3,4	Nearby	5	4	3
4	**Hotel**			
4,1	Rooms	4	5	4
4,2	Rating	4	4	5
4,3	Stardom	4	5	4
5	**Price**			
5,1	Room rate per night	3	5	4
5,2	Booking with payment on the spot	5	5	5
5,3	Free cancellation option	5	5	5
5,4	Availability of a loyalty program	5	0	5
Final assessment of competitiveness		**79,61%**	**71,65%**	**82,91%**

The disadvantages are that the competitiveness of real estate is assessed primarily in terms of meeting the needs of the buyer and his expectations. Accordingly, the same objects may have a different competitiveness assessment, in one case high, in the other case low, which complicates the application of this approach in the general analytics of options. In addition, if the consumer is considering several types of accommodation, for example, hotels, hostels and apartments, the selection of uniform evaluation factors can be quite laborious.

4 Conclusion

The hotel industry is represented by various means of accommodation, the most popular formats are hotels, country hotels, apartments and hostels. In general, the industry shows stable growth due to the increase in domestic tourism and the emergence of new areas (educational, medical, ecological tourism). A number of destinations that were previously unpopular faced a greatly increased flow of people, especially in the regions.
The key trends in the development of the hotel business are:
1. Demand - an increasing focus of Russian tourists on domestic destinations.

2. Offer - restructuring of the hotel market with the transition from international brands to Russian ones, further growth and development of local operators.

3. Expansion of the geography of travel in Russia for the mass consumer and the realization, in particular, of the country's potential in the genre of outdoor activities. This means creating additional points of growth for the emergence of new hotel and tourism projects.

The competitiveness of the hotel product is not a permanent category, but is formed under the influence of the changing external and internal environment of the hotel enterprise. External factors influencing the activities of a hotel enterprise include changes in consumer preferences, the actions of competitors, business partners, the degree of development of tourism, the demographic structure of the population, the economic development of a particular region, changes in the political situation in the region, the legislative framework for tourism, etc. Application of the considered method involves comparing options for premises as close as possible to the requirements of guests and ensuring the competitiveness of the hotel requires new approaches to the organization of guest service and management. The high competitiveness of the hotel is a guarantee of high profitability in market conditions. Competitiveness management involves the implementation of measures for the systematic improvement of services, the constant search for new types of advertising, new groups of potential customers, and service improvement. The basis of competitiveness is quality and price. At the same time, service at the highest level creates a great attraction. To manage competitiveness means to ensure the optimal ratio of these components, to direct the main efforts to improve product quality, reduce production costs, increase efficiency and level of service.

References

1. Pirogova, O., Gorin, E., Plotnikov, V. The algorithms for the environmental finance based on adjusted present value models. E3S Web of Conferences 91, 08021, (2019).

2. Yoshida, J. (2020). The economic depreciation of real estate: Cross-sectional variations and their return implications. Pacific-Basin Finance Journal. vol. 61, Article 101290 https://doi.org/10.1016/j.pacfin.2020.101290

3. Martín-Peña, M., Sánchez-López, J. and Díaz-Garrido, E. (2019). Servitization and digitalization in manufacturing: the influence on firm performance. Journal of Business & Industrial Marketing, vol. 35(3), pp. 564–574. https://doi.org/10.1108/JBIM-12-2018-0400

4. Fang, E., Palmatier, W.R. and Steenkamp, J.-B.E. (2008) Effect of Service Transition Strategy on Firm Value. Journal of Marketing. Vol. 72, pp. 1-14. https://doi.org/10.1509/jmkg.72.5.1

5. Li, Ya., Zhu, D., Zhao, J., Zheng, X., Zhang, L. (2020) Effect of the housing purchase restriction policy on the Real Estate Market: Evidence from a typical suburb of Beijing, China. Land Use Policy. vol.94. Article 104528. https://doi.org/10.1016/j.landusepol.2020.104528

6. Skribans, V., Jurušs, M., Demianchuk, M., Maslii, N., Pastory, D. (2020). Real estate announcements monitoring dataset for Latvia 2018. Data in Brief. vol. 28. Article 105064. https://doi.org/10.1016/j.dib.2019.105064

7. Pirogova, O., Makarevich, M. (2019). Research of problems of improving the welfare of citizens of the Russian Federation // International Scientific Journal. vol. 3, pp. 14-20. https://doi.org/10.34286/1995-4638-2019-67-3-14-20.

8. Carmichael, B.and Coën, A. Real estate as a common risk factor in the financial sector: International evidence, Finance Research Letters. vol. 32, 101172, (2020) https://doi.org/10.1016/j.frl.2019.04.029

9. Hasan, M. Corporate life cycle, organizational financial resources and corporate social responsibility. Journal of Contemporary Accounting & Economics, vol. 13. pp.20-36, (2017) https://doi.org/10.1016/j.jcae.2017.01.002

10. Kravchenko, O., Leshchenko, M., Marushchak, D., Vdovychenko, Y., Boguslavska, S. (2019). The 8th International Conference on Monitoring, Modeling & Management of Emergent Economy 65, 07004. https://doi.org/ 10.1051/shsconf/20196507004

11. Eggert, A., Hogreve, J., Ulaga, W., Muenkhoff, E. (2014). Revenue and profit implications of industrial service strategies. Journal of Service Research 17(1), 23-39. https://doi.org/ 10.1177/1094670513485823

12. Shkvarya, L. & Frolova, E.. (2022). Comparative Analysis of Foreign Trade Development in the Digital Segment by World Regions. Economy of Region. 18. 479-493. 10.17059/ekon.reg.2022-2-13.

13. Ho, Kim & Muhammad, Faishal. (2010). Explaining the macro-economy and retail real estate sector dynamic interaction between prime and suburban retail real estate sectors. Journal of Property Investment & Finance. 28. 77-108. 10.1108/14635781011024845.

14. Kaiser, Carina & Freybote, Julia. (2021). Is e-commerce an investment risk priced by retail real estate investors? An investigation. Journal of Property Research. 39. 1-18. 10.1080/09599916.2021.1996447.

15. Freybote, Julia & Simon, Lauren & Beitelspacher, Lauren. (2016). Understanding the contribution of curb appeal to retail real estate values. Journal of Property Research. 33. 1-15. 10.1080/09599916.2015.1135978.

16. Hangebruch, Nina. (2020). The clue is the mix. Multifunctional re-uses in former retail real estate properties. Proceedings of the Institution of Civil Engineers - Urban Design and Planning. 173. 1-33. 10.1680/jurdp.20.00041.

17. Lavrova T., Plotnikov V. The development of tourism: the experience of Russia // MATEC Web of Conferences. 2018. Volume 170. 01028 . DOI: 10.1051/matecconf/201817001028

18. Pirogova O., Shanygin S., Lavrova T., Plotnikov V. The hospitality industry development factors (case of St. Petersburg) // E3S Web of Conferences. 2021. Vol. 244. P. 10038. https://doi.org/10.1051/e3sconf/202124410038